8: Leach E-5 (1938) 1940 MA11 Kurd MA11
Rowanduz

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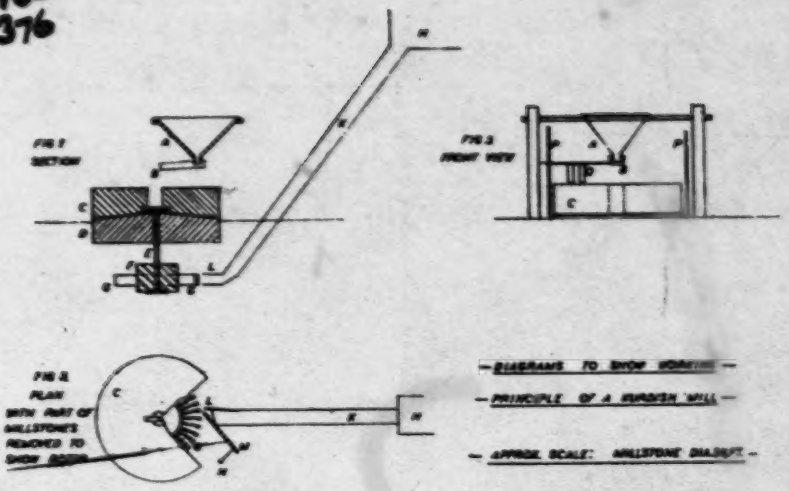

8: Leach E-5 (1938) 1940 MA11 Kurd MA11
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The Kurdish Water Mill - Hill Country, Turbine Type

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The diagrams opposite should be read in conjunction with the photographs at the end. The type of mill illustrated is found all over the Rowanduz area (Map 1. Area A) and probably has a wide distribution, it is not found however in the plains districts where an entirely different type of water wheel is in use. I have so far failed to trace a description of any similar mill elsewhere.

The operation of the mill is very simple though I know of no other example of primitive mechanism employing this turbine principle.

Water is supplied from a channel H and falls down a steep chute or feed pipe K. This is sometimes totally enclosed but more usually takes the form of a deep sided channel. The total head of water obtained by this means is about 20 feet. At the bottom of the feed pipe the water passes through a horizontal jet L, the aperture of which can be adjusted by a mechanism MN operated from the floor of the mill-house. From the jet the water plays onto a turbine rotor of wooden blades G set in a heavy stone boss F. These blades are set slightly on the skew and have a portion of the upper face cut away to provide a cup. The extent of the skew can be judged from photograph No.15 where a spare rotor block can be seen on the left of the picture. There is no bottom bearing and the whole rotor mechanism hangs freely from above, supported only by the steel shafting E. This latter passes through a hole in the lower millstone D_1 (which is fixed rigid in the surrounding masonry) and is slotted into the upper rotating millstone C. I did not see the apparatus dismantled so I am uncertain as to the precise method of keying the shafting into the rotor stones F and C or of the form of the bearing where the upper end of the shafting spins on the fixed stone D. The corn feed mechanism is best understood from the photograph. The corn passes from the bin A, into the dripfeed B. The dripfeed is attached to the device Q which is joggled by the rotation of the mill-stone. This causes the feed B to vibrate and drop the corn grains into the central hole of the millstone. The rate of feed is adjusted by varying the incline of the feed B. The screen P is erected round the back and sides of the millstone so as to prevent the flour flying out in all directions.

The following additional explanation refers to the diagrams only. In Fig.1 the structure supporting the corn bin and the screen P and also the mechanism for adjusting and vibrating the feed B are omitted. It should be understood that the lower stone D is set rigid in the ground, while the rotor mechanism FG hangs freely in a cavernous space underground. In Fig.3 the rotor and jet setting is oversimplified, and the skew setting of the rotor blades ignored. The jet L is actually slightly above the rotor blades and the direction of the water flow slightly downwards. The blades are thus struck in the centre at an incline of about 30 degrees rather than at the ends horizontally as the diagrams would seem to indicate. In actual operation the machine works remarkably smoothly at slow speeds, but as might be expected a violent vibration devlops if any attempt is made to drive the apparatus hard.

8: Leach E-S (1938) 1940 MA11 Kurd MA11
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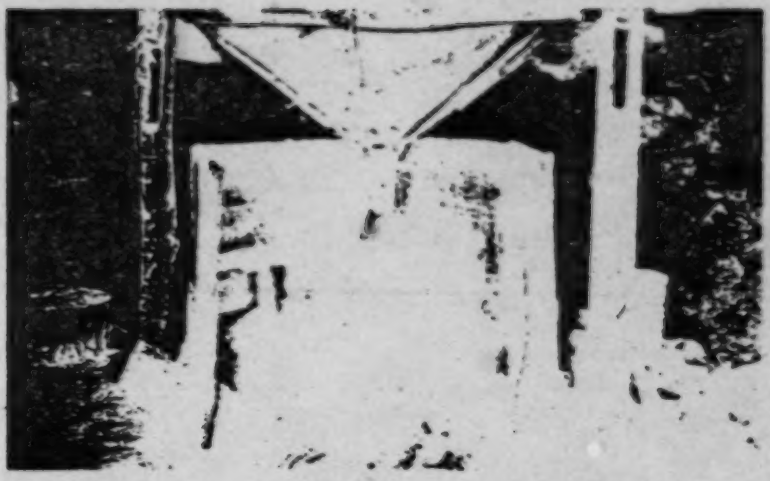

Plate 15.
Turbine Water Mill. (For comparison with diagrams; especially Fig. 2.)

Plate 16.
Turbine Water Mill. Rotor blades.

[Opposite page 74 - N.]